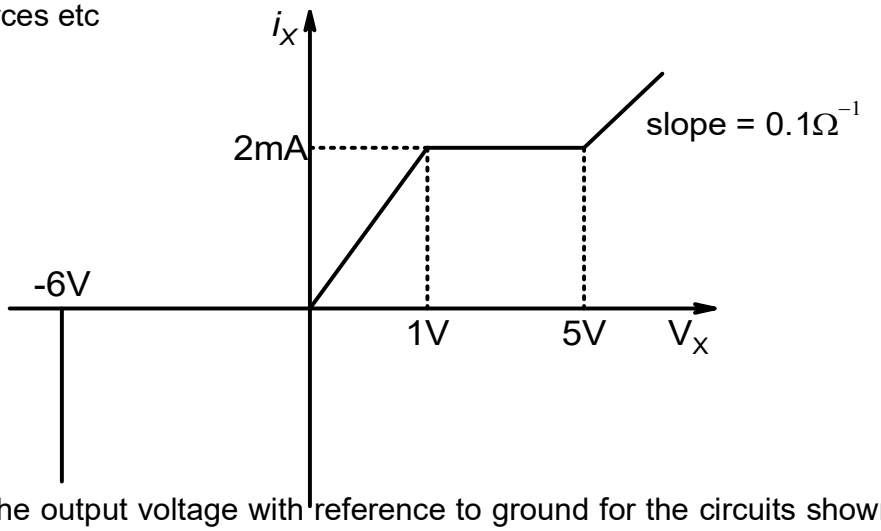
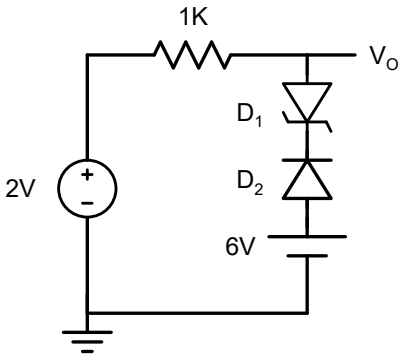
ESC201T: Introduction to Electronics

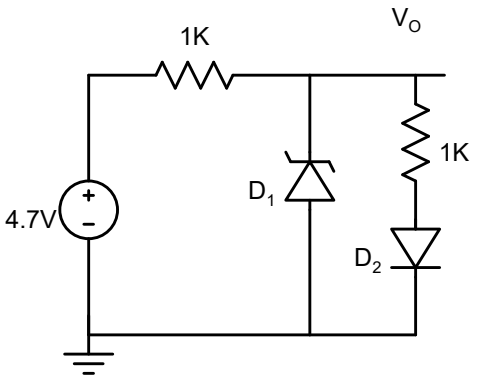
HW -7 **Date: 27.10.2010**

Q.1 Figure below shows current voltage characteristics of a two terminal device. One can note that there are five distinct regions of operation. Determine equivalent circuit for each of these regions in terms of common circuit elements such as resistors, voltage and current sources etc

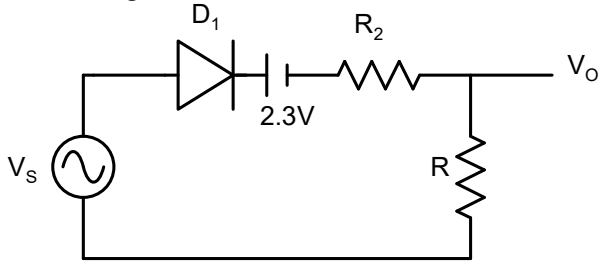


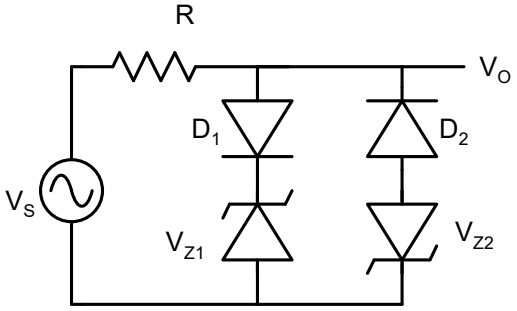
Q.2 Determine the output voltage with reference to ground for the circuits shown below assuming that cut-in voltage of both diode and zener diode is 0.7V and that Zener voltage is 3V





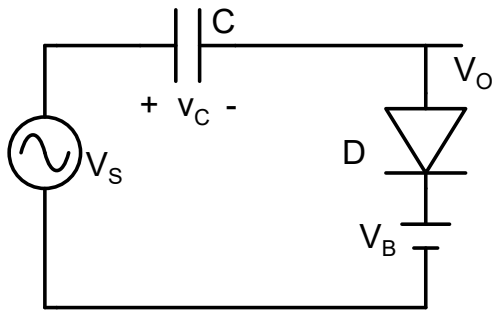
Q.3 Sketch the output voltage vs. input voltage characteristics for the clipper circuit shown below assuming cut-in voltage of both diode and zener diode is 0.7V and that Zener voltage is 3V

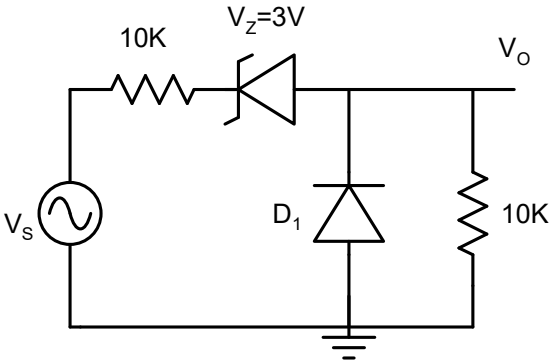




Modify the diode circuit shown above on the left such that output voltage is limited to 2V.

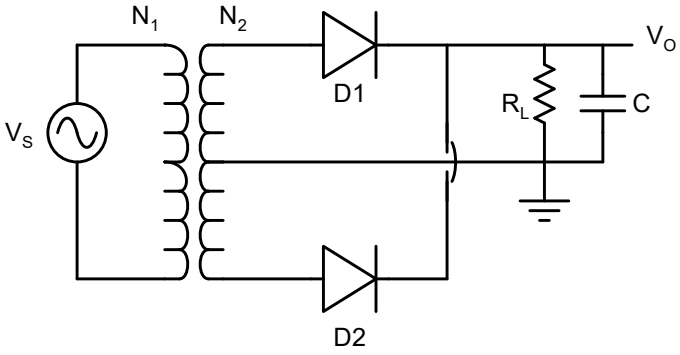
Q.4 Sketch the output voltage for the clamper circuit shown below on the left for sinusoidal input and assuming ideal diode.

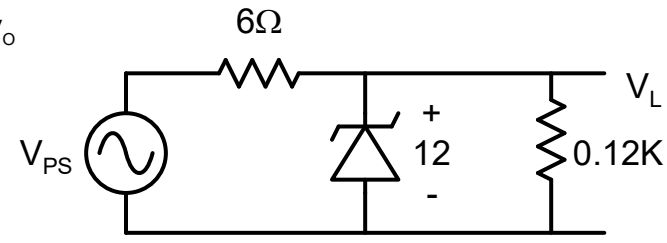




Q.5Determine the input-output characteristics of the circuit shown above on the right for input voltage varying between -10 and 10 V. Assume that cut-in voltage of the diodes is zero

Q.6 Design the power supply circuit shown above on the right that will supply 10V to a load of 1000Ω with ripple voltage less than 0.2V. As part of the design , determine transformer turns ratio, value of capacitance , diode peak current and peak inverse voltage. Assume that input is 220V rms with a frequency of 50Hz.





Q.7 For the circuit shown above on the right, can a zener diode with a maximum current rating of 0.25A be used? The input voltage varies between 13 and 15V.